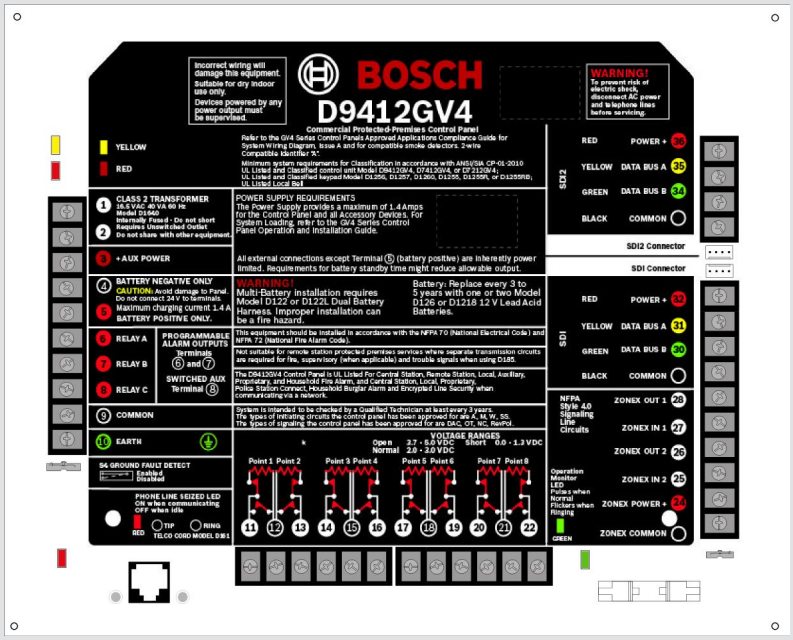

Control Panel

D9412GV4/D7412GV4 v2.03

BOSCH

en UL Installation Instructions

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1 Introduction

1.1 About documentation

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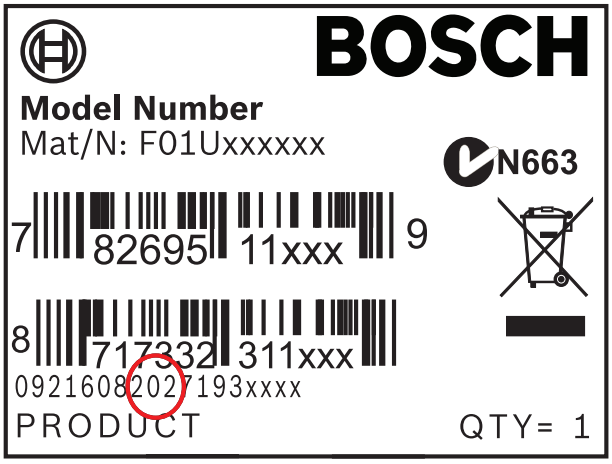
1.2 Bosch Security Systems, Inc. product manufacturing dates

Use the serial number located on the product label and refer to the Bosch Security Systems, Inc. website at http://www.boschsecurity.com/datecodes/.
The following image shows an example of a product label and highlights where to find the manufacturing date within the serial number.



2 Installation

2.1 Installation Preparation

This section contains a general installation procedure and refers to other sections of the document for detailed instructions. Review this document and the *D9412GV4/D7412GV4 Program Entry Guide* (P/N: F01U265459) before beginning the installation to determine the hardware and wiring requirements for the features used. Refer to the documents listed below for additional information:

– *D9412GV4/D7412GV4 v2.03 Installation and System Reference Guide (P/N: F01U265457)*
– *D9412GV4/D7412GV4 v2.03 Owner's Manual* (P/N: F01U287176)

2.2 Enclosure Options

Mount the control panel assembly in any of the enclosures listed below:

– D8103 Universal Enclosure (tan)
– D8109 Fire Enclosure (red) for the D9412GV4 and D7412GV4 Control Panels
– D8108A Attack Resistant Enclosure (tan)

Refer to the *Approved Applications* chapter inside the *D9412GV4/D7412GV4 v2.03 Installation and System Reference Guide (P/N: F01U265457) to* determine if the application requires a specific enclosure.

2.3 Mounting Enclosure

1. Run the necessary wiring throughout the premises.
2. Mount the enclosure in the desired location. Use all five enclosure mounting holes. Refer to the diagram for mounting locations and descriptions.
3. Pull the wires into the enclosure.

Notice!

Electromagnetic interference (EMI) can cause problems on long wire runs.

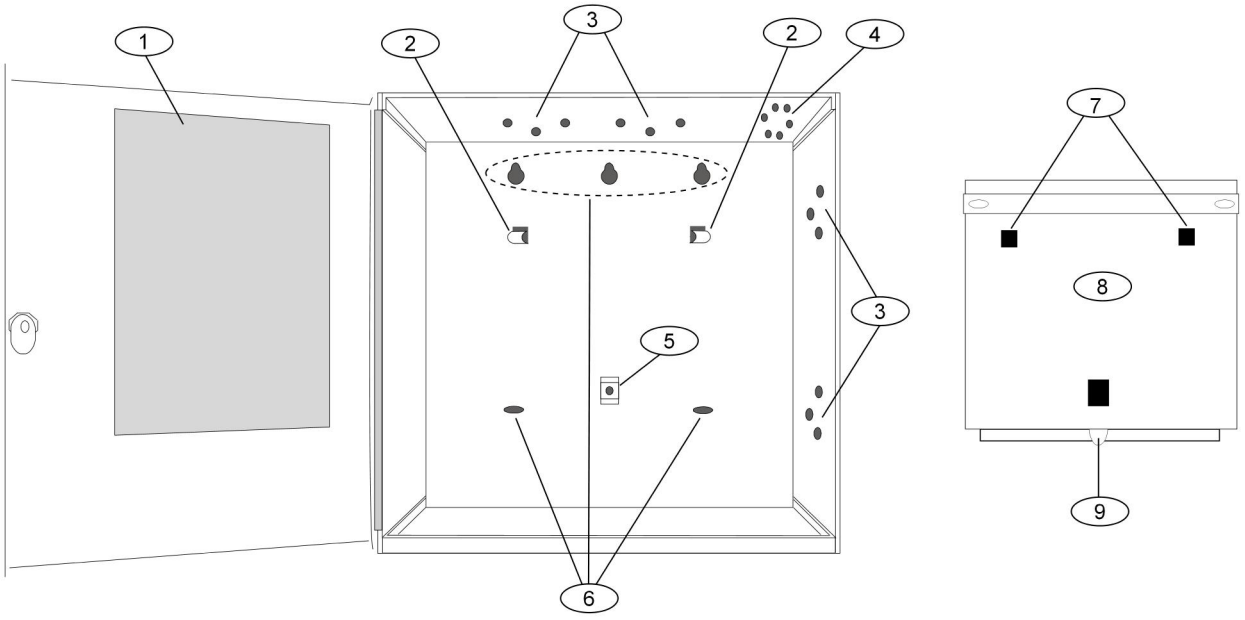


Figure 2.1: Enclosure Mounting

Callout - Description
1 - Point chart label
2 - Mounting skirt hooks (2)
3 - Module mounting holes (12)
4 - Tamper switch mounting holes (5)
5 - Skirt mounting hole (1)
6 - Enclosure mounting holes (5)
7 - Mounting skirt hook holes (2)
8 - Back of the control panel
9 - Lock down tab

2.4 Installing the Control Panel

1. Place the control panel over the inside back of the enclosure, aligning the large rectangular openings of the mounting skirt with the mounting hooks of the enclosure. Slide the control panel down so that it hangs on the hooks. Refer to *Figure 2.1*.
2. Remove the tape from the #6 x 1/4-in. screw in the mounting tab on the control panel. The screw passes through the mounting tab and into the skirt mounting hole in the enclosure. Tighten the screw to secure the control panel in the enclosure.
3. Connect earth ground to the control panel before making any other connections. Refer to *Connecting Earth Ground*.

2.5 Connecting Earth Ground

2.5.1 Terminal 10

To help prevent damage from electrostatic charges or other transient electrical surges, connect the system to earth ground at Terminal 10 before making other connections. Recommended earth ground references are a grounding rod or a cold water pipe.

Warning!

Do not use telephone or electrical ground for the earth ground connection. Use 14 AWG (1.8 mm) to 16 AWG (1.5 mm) wire when making the connection. **Do not connect** other control panel terminals to earth ground.

2.5.2 Ground Fault Detect Enable

Notice!

To meet UL 864 requirements, enable Ground Fault Detect.

A ground fault is a circuit impedance to earth ground. The control panel has a ground fault detection circuit that, when enabled, detects ground faults on Terminals 1 to 9 and 11 to 36. The control panel also detects and annunciates ground faults on any device connected to it. If a ground fault condition occurs, the keypads display SERVC GND FAULT and the control panel sends a GROUND FAULT TROUBLE, AREA 1. When the control panel recognizes that the ground fault condition is corrected, and remains corrected for between 5 to 45 consecutive seconds, a Restoral Report is sent.

2.5.3 Enabling Ground Fault Detection

To enable the Ground Fault Detect Enable feature, lock (close) the S4 Ground Fault Detect Pin on the control panel.

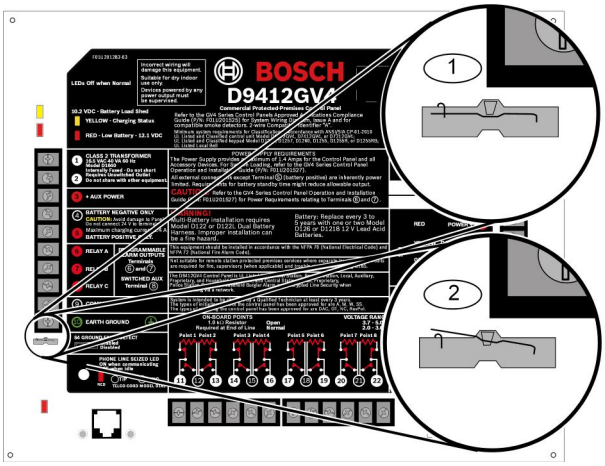


Figure 2.2: Ground Fault Detect (S4)

Callout - Description
1 - S4 Locked (Closed). Control panels detects ground faults.
2 - S4 Unlocked (Open). Control panel does not detect ground faults.

2.5.4 Ground Fault Impedance Specifications

The table below provides the impedance specifications for detecting ground faults when any terminal or field wiring is shorted to ground.

Impedance	Control Panel Detects Ground Fault
≤ 300 Ω	Yes
300 Ω to 200 k Ω	Detection depends upon the terminal
≥ 200 k Ω	No

Table 2.1: Ground Fault Impedance Specifications

2.5.5 Locking the Reset Pin

Locking the reset pin disables the control panel. When the reset pin is locked, the control panel is disabled. CALL FOR SERVICE appears in some keypad displays (SDI2 keypads display *enter Installer Passcode*) when the pin is locked down.

On-board outputs (Terminals 6 and 7) and off-board outputs deactivate when the control panel is disabled. Terminal 8 has power when the output is deactivated. Activation interrupts power at that terminal. The on-board output (Terminal 8) remains deactivated when the reset pin is locked in the disable position.

Unlocking the reset pin from the locked position resets the control panel. The control panel resets all its timers, counters, indexes, and buffers. Any points that restore after a reset do not generate Restoral Reports.

If the reset pin is placed in the Lock position, and all areas are armed, the control panel will not answer RPS over a phone line unless the Answer Armed program item has a value other than zero in it. No entry is required for network or RPS Enhanced direct connection communication. Refer to *RPS Parameters* in *RPS Help*.

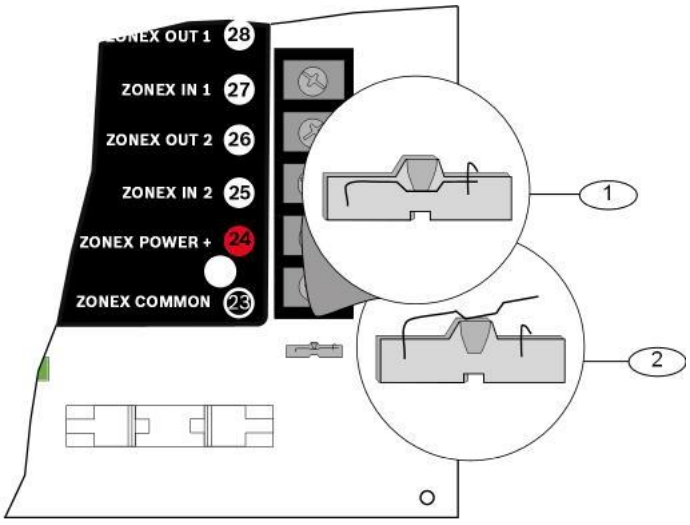


Figure 2.3: Reset Pin

Callout - Description
1 - Reset pin locked (closed)
2 - Reset pin normal (open)

3 Diagrams

3.1 Faceplates

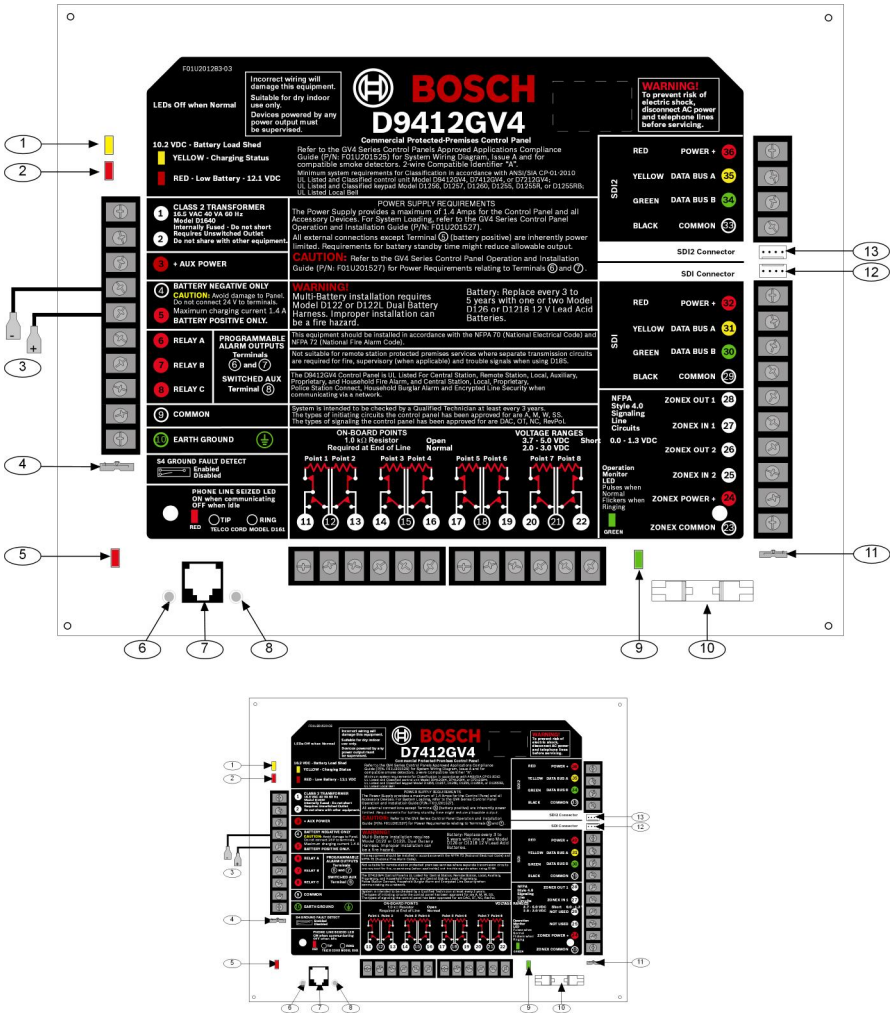


Figure 3.1: Faceplates

Callout - Description	Callout - Description
1 - Charging status LED (yellow)	8 - Ring
2 - Low battery LED (red)	9 - Operation monitor LED (green)
3 - Color-coded battery leads	10 - Accessory connector
4 - Ground fault detect enable	11 - Reset pin
5 - Phone LED (red)	12 - SDI interconnect wiring connector
6 - Tip	13 - SDI2 interconnect wiring connector
7 - Telephone cord connector	

3.2 Power Supply Side Wiring Diagrams

3.2.1 D9412GV4/D7412GV4 v2.00 (and higher) Power Supply Side System (D113, D122/D122L, D192G, D928, D1640, D8132) Wiring Diagram (Power and Phone)

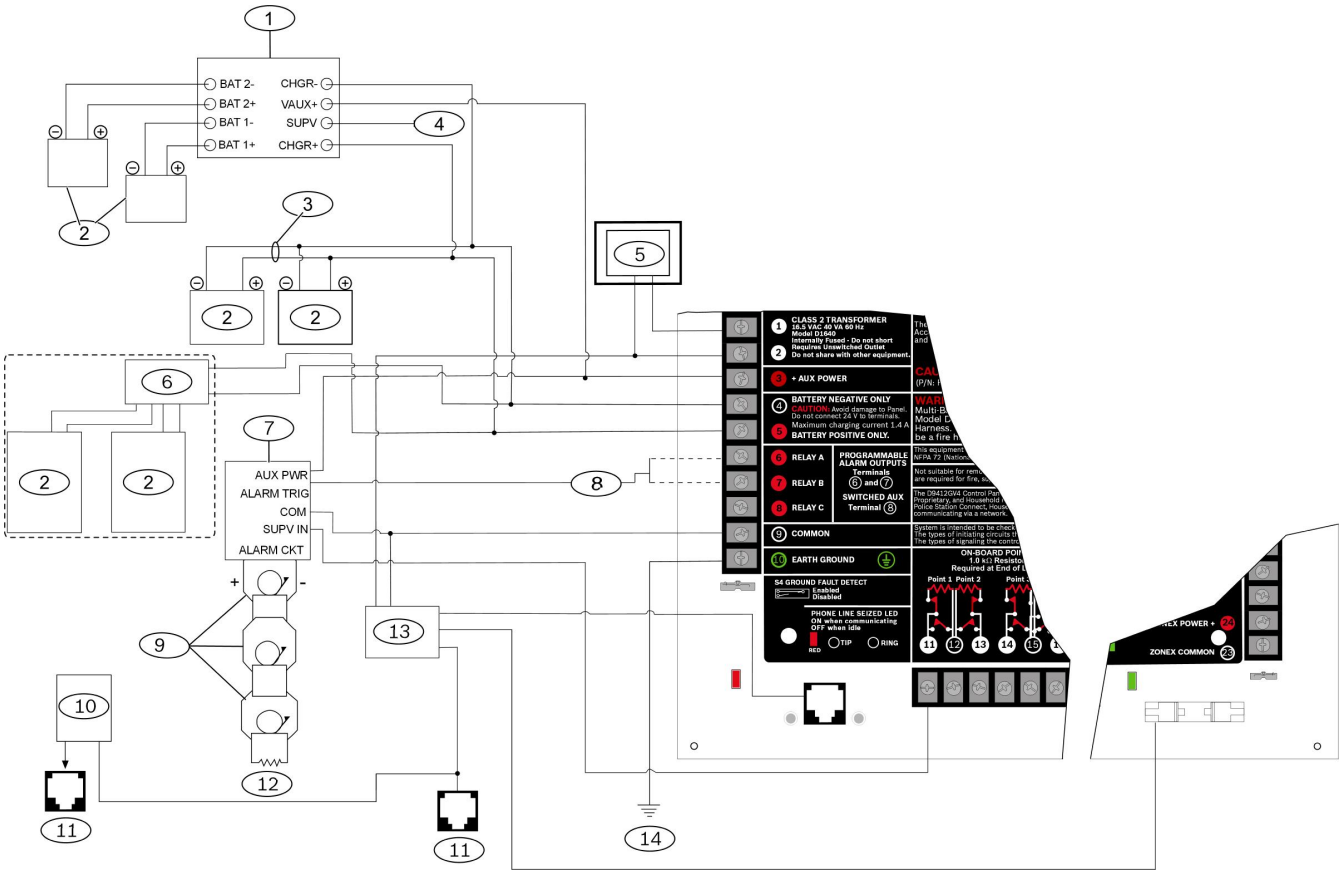


Figure 3.2: Side System Wiring Diagram

Callout - Description	Callout - Description
1 - If required by local AHJ, connect D113 Battery Lead Supervision Module.	8 - To Output A or Output B
2 - Batteries	9 - Listed Audible Signaling Devices rated at 12.0 VDC nominal (do not use vibrating type horns)
3 - D122/D122L Dual Battery Harness, as required	10 - C900V2 (optional)
4 - To Supervision Point	11 - Secondary phone line (part of D928)
5 - D1640 Transformer (NFPA applications may require the use of a D8004 Transformer Enclosure	12 - 560 Ω, 2 W end-of-line (EOL) Resistor (P/N: 15-03130-005)
6 - D8132 Dual Battery Charger with two batteries (Batteries are not supervised.)	13 - D928
7 - D192G Bell Supervision Module	14 - To earth ground

Notice!
For UL Certified accounts, additional power can be obtained using only a UL Listed auxiliary 12.0 VDC regulated, power-limited power supply.

Notice!
All terminals accept for Outputs A, B, and C (Terminals 6, 7 and 8) are supervised.

3.2.2 Wiring D125B to G-series control panels

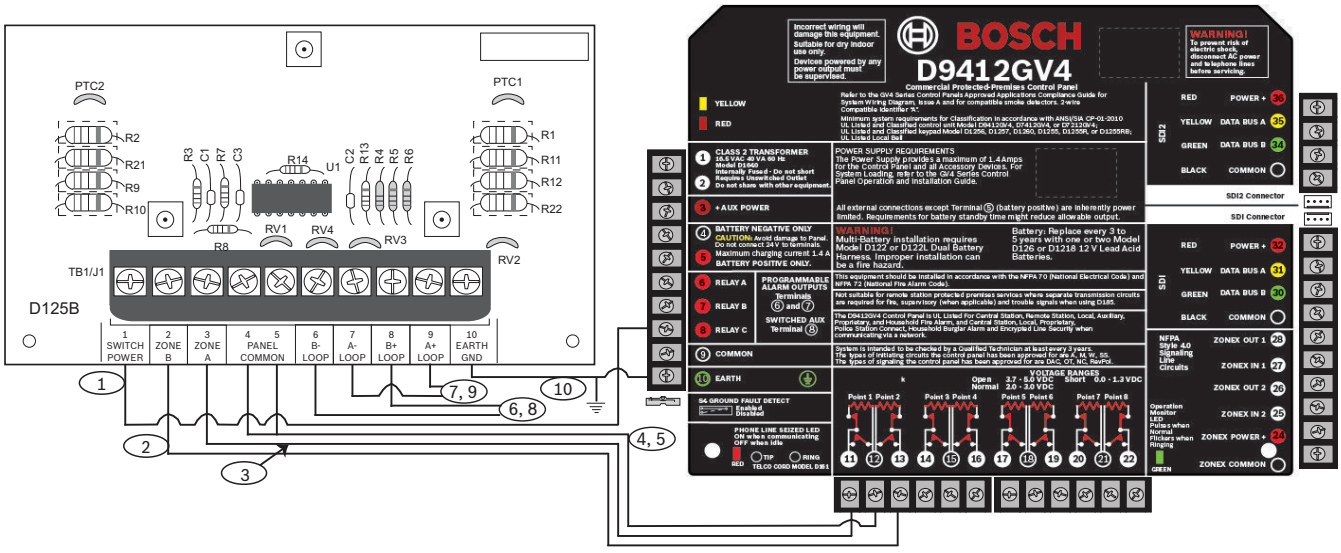


Figure 3.3: Wiring two-wire loops using a D125B (D9412GV4 shown)

Callout – Description	Callout – Description
1 – Switched auxiliary power from the control panel's relay C	7 – Power-limited, supervised negative to A LOOP detectors
2 – Supervised connection to Zone B power from an on-board point of the panel	8 – Power-limited, supervised positive to B LOOP detectors
3 – Supervised connection to Zone A power from an on-board point of the panel	9 – Power-limited, supervised positive to A LOOP detectors
4/5 – Connection from control panel COMMON (one connection only)	10 – Earth ground
6 – Power-limited, supervised negative to B LOOP detectors	

3.3 D9412GV4/D7412GV4 v2.00 (and higher) Input Points and Peripheral Devices (D125B, D129, D130) System Wiring Diagram

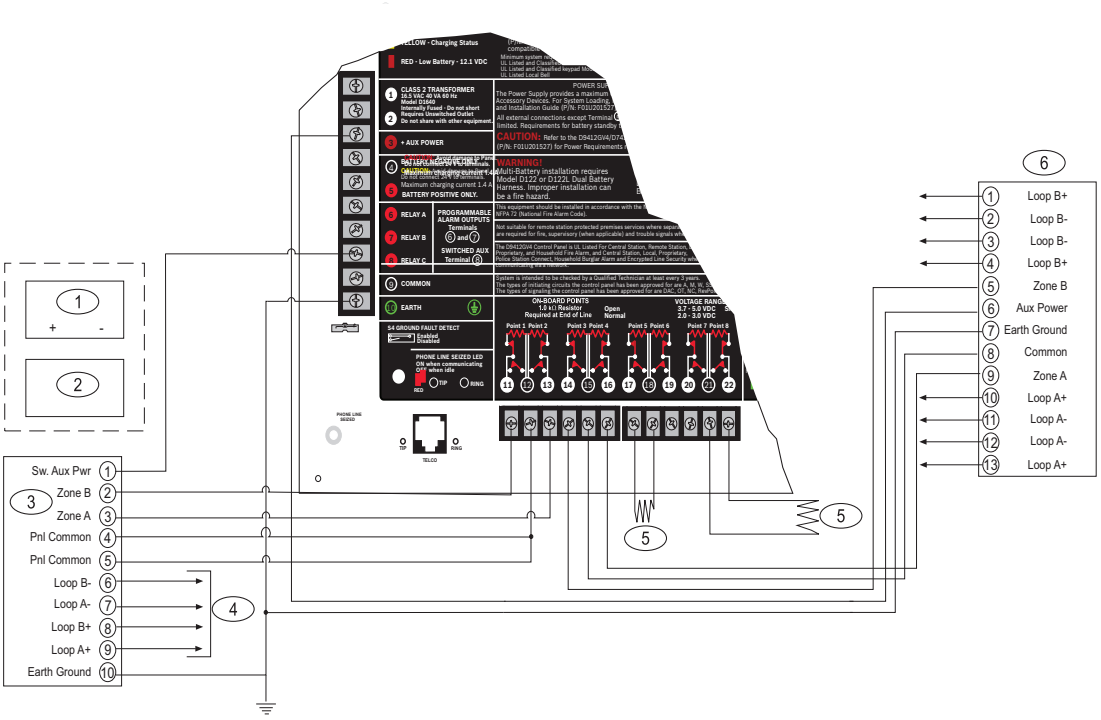


Figure 3.4: Input Points and Peripheral Devices System Wiring Diagram

Callout - Description
1 - (Optional): For 24 V applications use a UL 1481 Listed regulated, power-limited 24 VDC power supply with a D130 Relay Module. Refer to the *D130 Installation Instructions (P/N: F01U072455)* for correct wiring requirements.
2 - D130 Relay Module
3 - D125B Powered Loop Interface Module
4 - To UL Listed two-wire smoke detectors with a fire rated EOL resistor. Refer to *Two-Wire Smoke Detectors* section in the *Approved Applications* chapter in the *D9412GV4/D7412GV4 v2.03 Installation and System Reference Guide* (P/N: F01U265457) for a listing of compatible two-wire smoke detectors.
5 - 1 kΩ EOL resistor (P/N: F01U033966): For typical alarm applications.
6 - D129 Dual Class A Initiation Circuit Module: Provides optional Waterflow Alarm Retard feature. Not suitable for two-wire smoke detectors.

Notice!

For D129, use zero retard except for waterflow devices.

All external connections except Terminal 5 (battery positive) are power limited.

3.4 SDI and Zonex Devices Wiring Diagrams

3.4.1 D9412GV4 SDI and Zonex Devices (B420/B426, B450, D1255/D1255RB, D1256RB, D1257RB, D1265, D8125, D8128D, D8129, DX4020, ITS-DX4020-G, D9210C D9127U/T) System Wiring Diagram

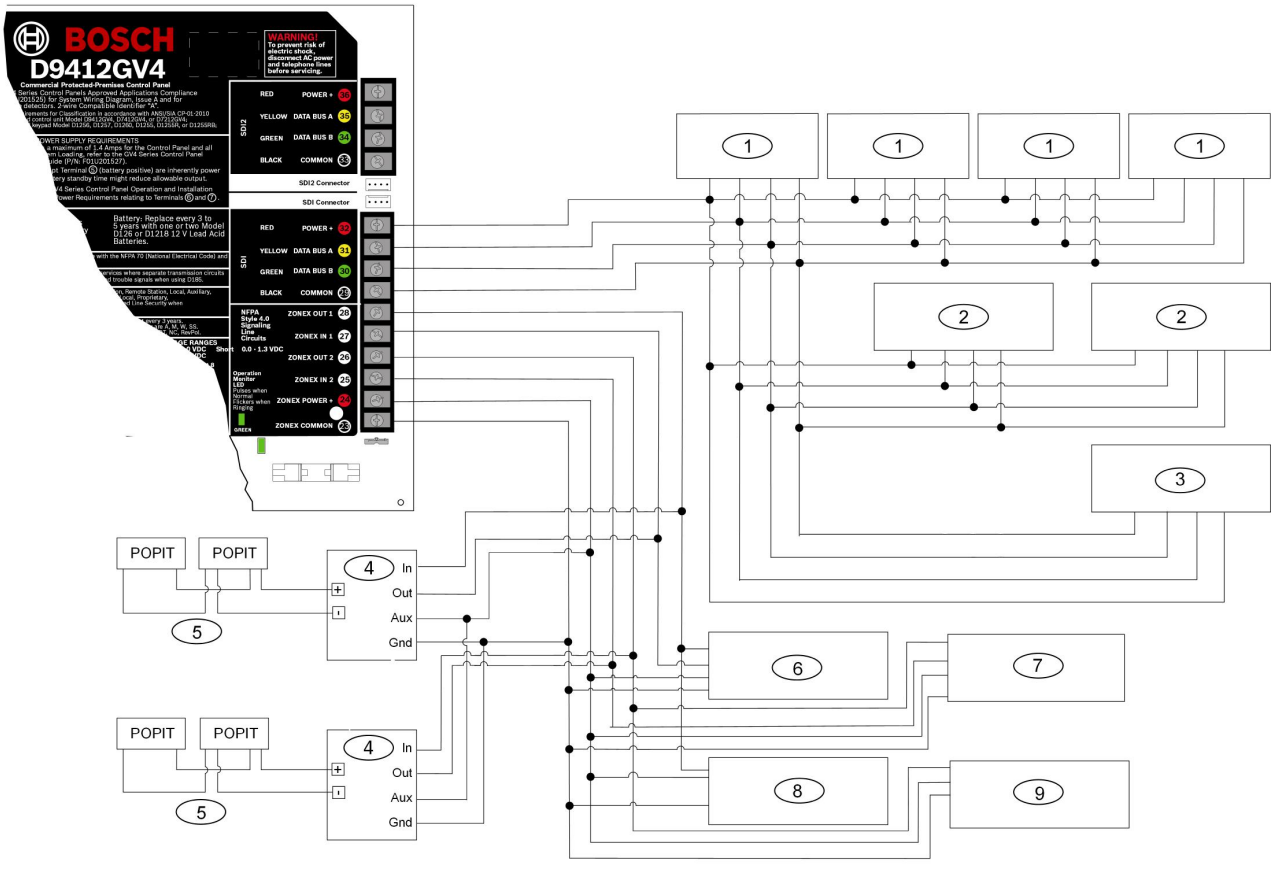


Figure 3.5: D9412GV4 System Wiring Diagram, SDI and Zonex Devices

Callout – Description	Callout – Description
1 – Up to 16 supervised, D1255 (all versions), D1255RB, D1256RB Keypads, D1257RB Fire Annunciators, D1265 or up to 8 supervised D1260 Keypads (all versions) (maximum 16 supervised, maximum 32 unsupervised)	6 – Zonex 1: 15 D8128Ds maximum[1]
2 – Up to 8 D9210C Access Control Interface Modules	7– Zonex 2: 15 D8128Ds maximum[1]
3 – Up to 2 B450, B426/B420/DX4020 or ITS-DX4020-G communication modules	8 – Zonex 1: Up to 8 D129s maximum[1]
4 – D8125 POPEX Module	9 – Zonex 2: Up to 8 D8129s maximum[1]

Callout – Description	Callout – Description
5 – Up to 119 D9127U/T POPITs	
[1]The number of D8129 OctoRelays that can be connected to each Zonex terminal on the control panel is limited by the number of D8128D OctoPOPITs connected to the same terminal. Refer to the *D8128D Installation Guide* (P/N: F01U070537) or the *D8129 Operation and Installation Guide* (P/N: F01U036302) for specific information.	

Notice!
Terminals 24 through 36 are power limited, supervised. Fire and Intrusion devices must be on separate circuits. Refer to *ICP-SDI-9114 Installation Instructions* (P/N: F01U030068)

3.4.2 D7412GV4 SDI and Zonex Devices (B420/B426, B450, D1255/D1255RB, D1256RB, D1257RB, D1265, D8125, D8128D, D8129, DX4020, ITS-DX4020-G, D9210C D9127U/T) System Wiring Diagram

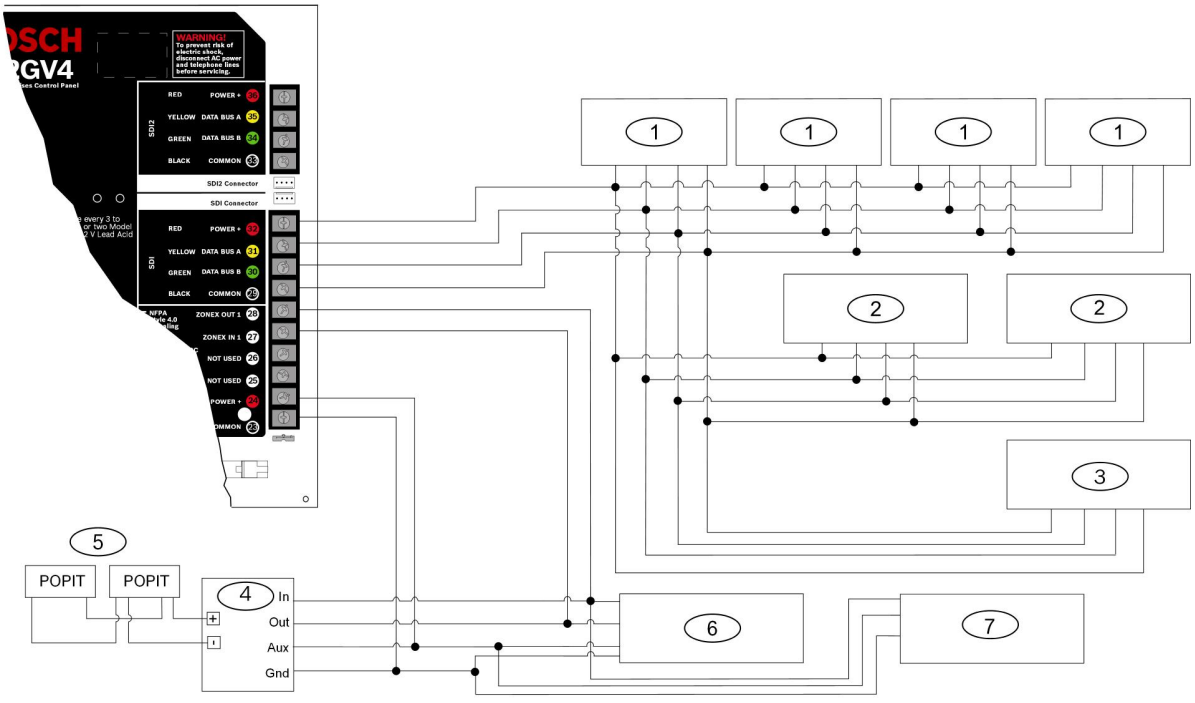


Figure 3.6: D7412GV4 SDI and Zonex Devices System Wiring Diagram

Callout - Description
1 - Up to 16 supervised D1255 (all versions), D1255RB, D1256RB Keypads, D1257RB Fire Annunciators, D1265 or up to 8 supervised D1260 Keypads (all versions) (maximum 16 supervised, maximum 32 unsupervised)
2 - Up to 2 D9210C Access Control Interface Modules
3 - Up to 2 B450, B426/B420/DX4020 or ITS-DX4020-G communication modules
4 - D8125 POPEX Module
5 - Up to 67 D9127U/T POPITs

6 - Zonex 1: Up to 9 D8128Ds maximum
7 - Zonex 1: Up to 8 D8129s maximum[1]
[1]The number of D8129 OctoRelays that can be connected to each Zonex terminal on the control panel is limited by the number of D8128D OctoPOPITs connected to the same terminal. Refer to the D8128D *Installation Guide* (P/N: F01U070537) or the D8129 *Operation and Installation Guide* (P/N: F01U036302) for specific information.

Notice!

Terminals 24 through 36 are power limited, supervised.

Fire and Intrusion devices must be on separate circuits. Refer to *ICP-SDI-9114 Installation Instructions* (P/N: F01U030068).

3.5 D9412GV4/D7412GV4 SDI2 Devices (B208, B308, B420/B426, B450, B520, B810, B820, B915/B920/B921C/B930/B942/ B942W) System Wiring

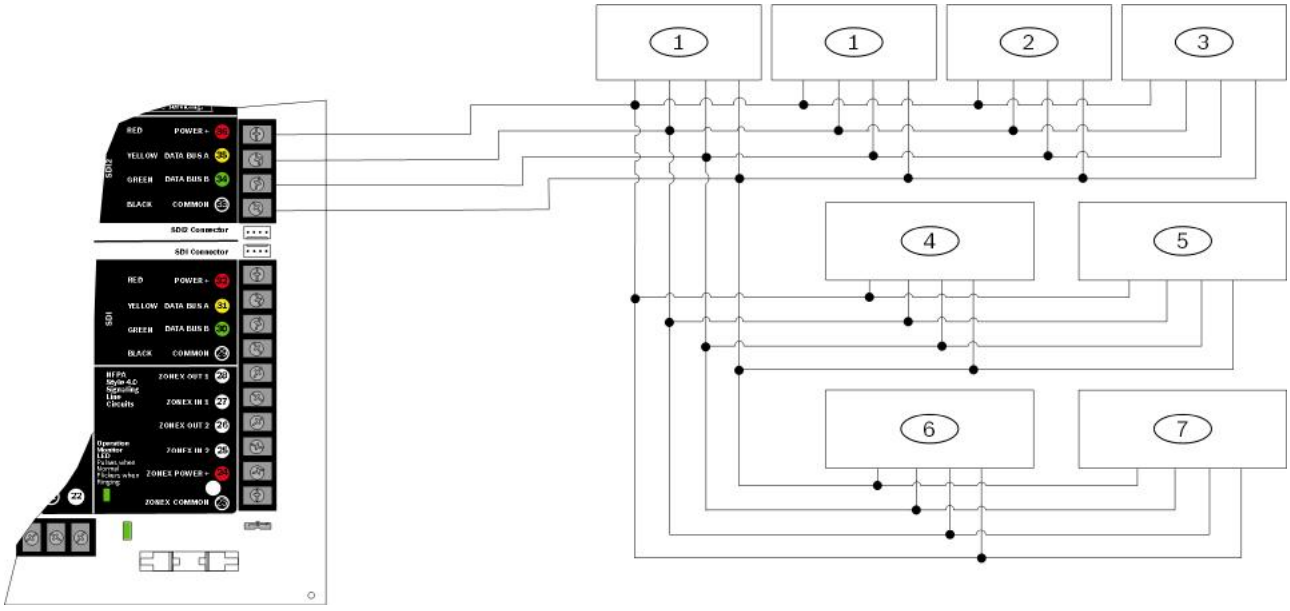


Figure 3.7: SDI2 Devices System Wiring Diagram

Callout - Description
1 – B208 Octo-input Modules[1]
2 – B308 Octo-output Modules[1]
3 – B420 communication modules/B426, or B450[1]
4 – B810 wireless receiver or B820 SDI2 Inovonics Interface Modules[1]
5 – B915 Basic Keypad/B920 Two-line Alphanumeric Keypad/B921C Two-line Capacitive Keypad with Inputs[1]
6 – B930 ATM Style Alphanumeric Keypad/B942/B942W Touch Screen Keypad[1]
7 – B520 Auxiliary Power Supply Module[1]
[1]Refer to the table below for information on the capacity of each GV4 Series Control Panel for SDI2 modules.

D9412GV4/D7412GV4 Capacities

Module	D9412GV4	D7412GV4
B208 Octo-input Modules	24	7[1]
B308 Octo-output Modules	12	6[2]
B420/B426 Conettix Ethernet Communication Module	2[3]	2[3]
B450 Plug-in Communication Interface	2[3]	2[3]
B810/B820 SDI2 Inovonics Interface Modules[4]	1	1
B915 Basic Keypad[5]	16	16
B920 Two-line Alphanumeric Keypad[5]	16	16
B921C Capacitive Keypad with Inputs[5]	16	16
B930 ATM Style Alphanumeric Keypad (SDI2)[5]	16	16
B942/B942W Touch Screen Keypad[5]	16	16
B520 Auxiliary Power Supply Module	8	8

[1]For the D7412GV4, only 5 inputs are available on the Octo-input at address 7.
[2]For the D7412GV4, only 4 outputs are available on the Octo-output at address 6.
[3]For the B450/B426/B420, only two devices can be installed at one time.
[4]For the B810 and B820 wireless receivers, only one device can be installed (either B810 or B820 receiver) at one time.
[5]For the B915, B920 ,B921C, B930 or B942/B942W a total of 16 keypads in any combination can be installed at one time.

Notice!

Terminals 33 through 36 are power limited, supervised. Fire and Intrusion devices must be on separate circuits. Refer to *ICP-SDI-9114 Installation Instructions* (P/N: F01U030068).

3.5.1 SDI2 Bus Wiring Recommendations

Use the following SDI2 bus wiring recommendations for SDI2 installation. The SDI2 bus is used by the GV4 Control Panel and corresponding modules to communicate with one another. Modules can be connected via home run, daisy chain, or single level T-tapped anywhere on the SDI2 bus. Please reference Figure 2.7 below.

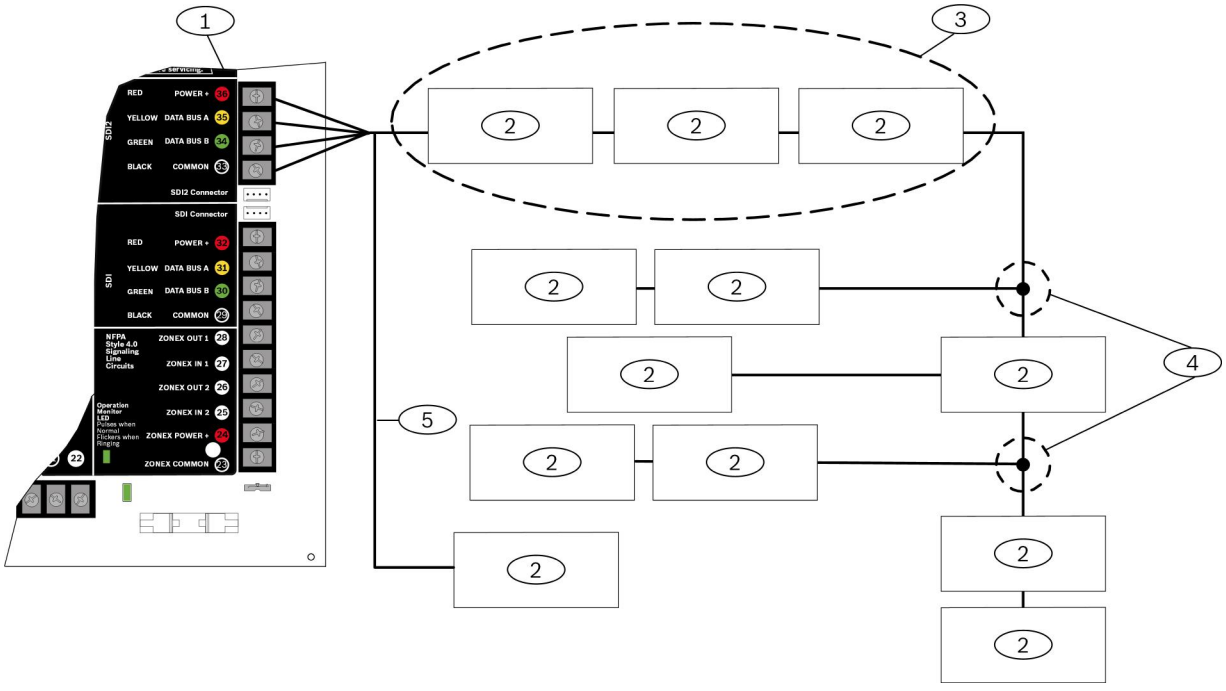


Figure 3.8: SDI2 Bus Wiring

Callout – Description
1 – Control panel
2 – SDI2 module
3 – Daisy chained wiring
4 – Single-level T-tapped wiring
5 – Home run wiring

If the voltage at any device is below the minimum, you must add an auxiliary power supply to the system to power these devices.

Notice!

The absolute lowest voltage for the SDI2 devices is 10 VDC at the device terminals when in normal operation, with a fully charged battery on the system.

Maximum cable lengths

The following rules must be followed when wiring the SDI2 bus.

- The SDI2 bus requires the use of **non-shielded** cable from 12 AWG to 22 AWG.
- Maximum overall cable length based on the table listed below:

Cable capacitance	**Overall cable length**	**Cable capacitance**	**Overall cable length**	**Cable capacitance**	**Overall cable length**	**Cable capacitance**	**Overall cable length**
pF/ft	ft	pF/ft	ft	pF/ft	ft	pFf/ft	ft
< 17	7500	22	6363	27	5185	32	4400
18	7500	23	6086	28	5000	33	4242
19	7350	24	5800	29	4828	34	4100
20	7000	25	5600	30	4700	35	4000
21	6666	26	5385	31	4516	36	3800

Table 3.1: Maximum cable length

Notice!
Use Non-shielded cable only.

Notice!
Maximum capacitance of 140nF (140,000 pf) per system. Contact the wire manufacturer for the capacitance ratings of the wire being used.

3.6 Keyswitch Wiring

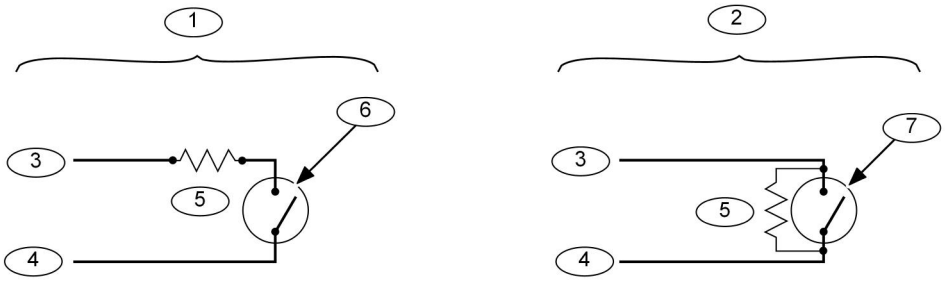


Figure 3.9: Keyswitch Wiring

Callout - Description
1 - Maintained keyswitch
2 - Momentary keyswitch
3 - Common
4 - Point Input
5 – End of Line (EOL) resistor*
6 - Open on a circuit arms the area
7 - Short on a circuit toggles the arming state
*Use proper EOL for the specific device you are using.

4 Power Supply and Power Outputs

4.1 Power Supply - Primary

4.1.1 Primary (AC) Power Circuit

The primary source is a 16.5 VAC, 40 VA, internally-fused transformer (Bosch Security Systems, Inc. Model D1640). The control panel draws 225 mA when idle and 300 mA when in an alarm state. The total available auxiliary current is 1.4 A. Transient suppressors and spark gaps protect the circuit from power surges. This protection relies on the ground connection at Terminal 10. Ensure that you connect Terminal 10 to a proper ground. Refer to *Connecting Earth Ground, page 8*.

AC Power Fail

The system indicates an AC power failure when Terminals 1 and 2 do not have power. The AC Fail Time parameter sets the number of minutes or seconds without AC power before the control panel acknowledges the failure and the number of minutes or seconds after the power returns before the control panel acknowledges restored power.

Refer to the *D9412GV4/D7412GV4 v2.02 Program Entry Guide* (P/N: F01U265459) for additional information about AC Fail Time and UL 864 requirements.

Reference the table below to view the Modem4 communication format signals.

Modem4 Events	Modem4 code D6500 Mode	Modem4 Code Bosch SIA Mode	Contact ID Events	Contact ID Codes
AC Fail - mains power supply	Pssss	NAT	AC Loss	1 301 00 000
AC Restore - mains power supply	Rsss0	NAR	AC Loss	3 301 00 000

Table 4.1: AC Power Fail

4.1.2 Installing the Transformer

Notice!

Do not short-circuit the terminals of the transformer. Shorting the terminals opens the internal fuse, causing permanent failure. Connect the transformer to Terminals 1 and 2 of the control panel before plugging it into the power source.

1. Use 18 AWG (1.22 mm) wire (minimum) to connect the transformer to the control panel. The wire length should be as short as possible. The maximum length is 50 ft (15 m). Connect the battery and plug in the transformer.
2. Route telephone and sensor loop wiring away from any AC conductors, including the transformer wire.
   AC wiring can induce noise and low level voltage into adjacent wiring. Route data wiring away from AC and telephone wiring.

Notice!

Always connect the battery first and then plug in the transformer.

3. Connect the battery. Refer to *Installing the Battery, page 23*
4. Plug the transformer into an unswitched, 120 VAC 60 Hz power outlet only.
5. Secure the transformer to the outlet with the screw provided.

D8004 Transformer Enclosure Required for Fire Systems
Use the D8004 Transformer Enclosure for the D1640 Transformer in fire and combined fire and burglary applications.

Notice!
Check with the Authority Having Jurisdiction (AHJ) about mounting transformers on specific circuits.

4.2 Power Terminals - Secondary

4.2.1 Secondary (DC) Power

A 12 V, 7 Ah (up up to 18 Ah) sealed lead-acid rechargeable battery supplies secondary power for auxiliary and alarm outputs, and powers the system during interruptions in primary (AC) power.

Warning!
Use Lead Acid Batteries Only: The charging circuit is calibrated for lead-acid batteries. Do not use gel-cell or nicad batteries.

Extra Batteries Increase Back-up Time
To increase battery back-up time, connect a second 12 V battery in parallel to the first battery. Use a D122/D122L Dual Battery Harness to ensure proper and safe connection. Refer to the *Standby Battery and Current Rating Chart* in the *Approved Applications* section of the D9412GV4/D7412GV4 v2.02 Installation and System Reference *Guide* (P/N: F01U265457) for battery standby time calculations.

D1218 Battery
The D1218 is a 12 V, 18 Ah battery for use in applications requiring extended battery standby time. Up to two D1218 batteries can be connected when used with a D122 Dual Battery Harness.

Warning!
When connecting two D1218 Batteries to the control panel, the control panel can charge up to 36 Ah of battery.

Notice!
When using two D1218 batteries, use a separate enclosure and a D122L Dual Battery Harness.

4.2.2 Installing the Battery

1. Place the battery upright in the base of the enclosure.
2. Locate the red and black leads supplied in the literature pack.
3. Connect the black battery lead to Terminal 4, and then to the negative (-) side of the battery.
4. Connect the red battery lead to Terminal 5, and then to the positive (+) side of the battery.

Warning!

High current arcs are possible. The positive (red) battery lead and Terminal 5 can create high current arcs if shorted to other terminals or the enclosure. Use caution when working with the positive lead and Terminal 5. Always disconnect the positive (red) lead from the battery before removing it from Terminal 5.

Warning!

The battery terminals and wire are not power limited. A 0.250 in (6.4 mm) space must be maintained between the battery terminals, battery wiring, and all other wiring. Battery wiring cannot share the same conduit, conduit fittings, or conduit knock-outs with other wiring. Refer to the *Battery Terminals* illustration.

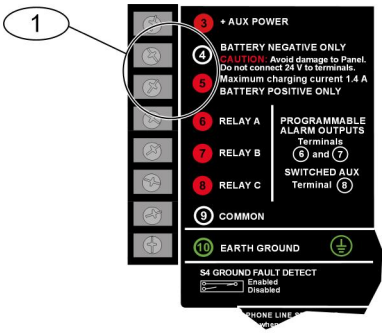


Figure 4.1: Battery Terminals

Callout - Description
1 - Battery terminals. Terminal 5 is non-power limiting.

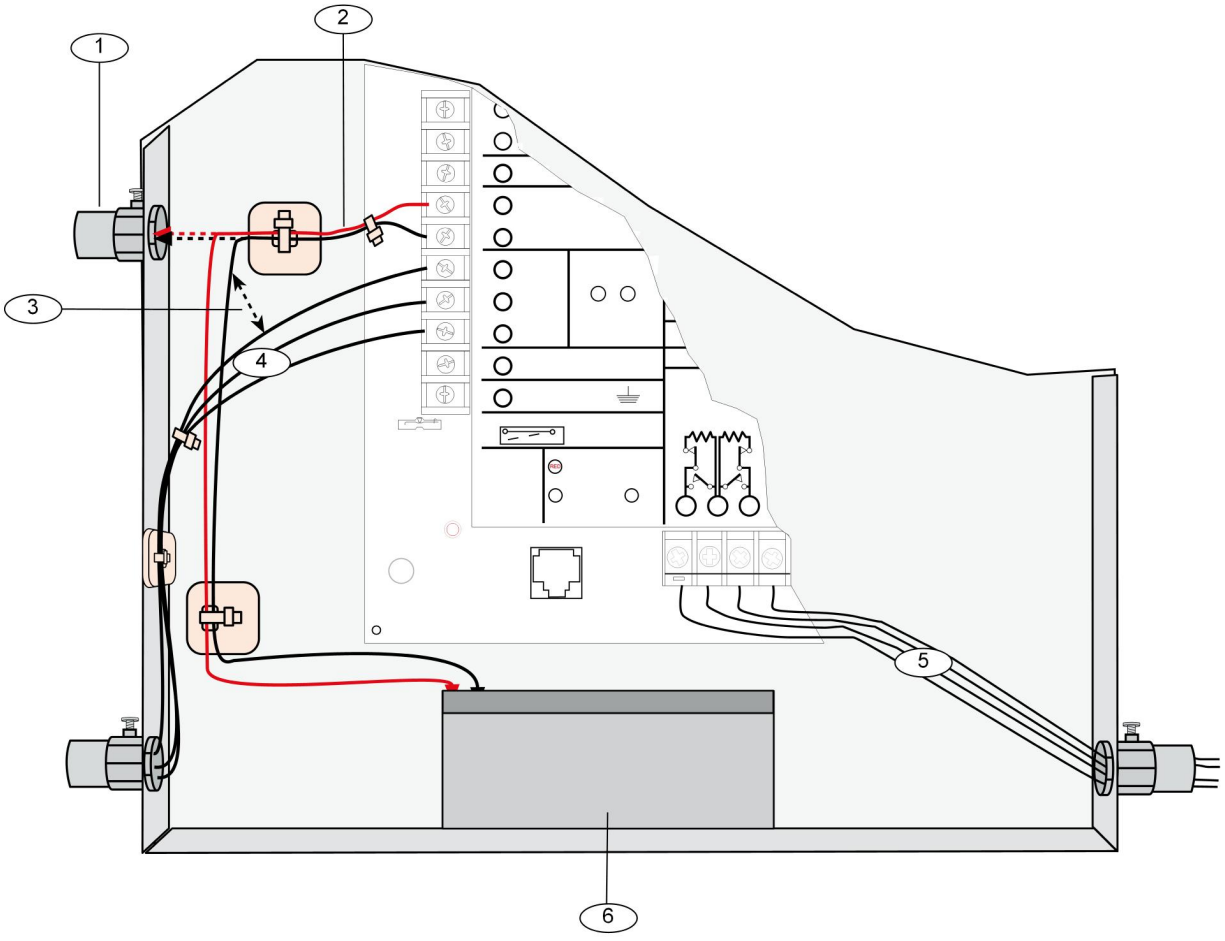


Figure 4.2: Non-PowerLimited Wiring

Callout – Description
1 – Conduit required for use with external batteries.
2 – Battery wires
3 – 0.25 in (6.4 mm) minimum. To ensure proper spacing, use tie-wraps or similar devices to secure wires.
4 – Relay output wires
5 – Input or Zone wires
6 – Standby battery

4.3 Power Outputs - Circuit Protection

5 PTC's protect the control panel from short circuits on the continuous and programmable power outputs. The PTC assignments are listed below.

PTC CB2 protects:

– Terminal 3: Auxiliary Power

PTC CB4 protects:

– Terminal 6: Output A (Alarm Power Output)

– Terminal 7: Output B (Alternate Alarm Power Output)

– Terminal 8: Output C (Switched Auxiliary Power)

PTC CB5 protects Terminal 24: Zonex Power.

PTC CB1 protects Terminal 32: SDI Power +.

PTC CB3 protects Terminal 36: SDI2 Power +.

Required by UL:

– All devices powered from a power output are to be supervised.
– Power outputs are not shared between fire and non-fire devices unless all devices are in conduit within 20 ft, and in the same room.

4.4 Power Outputs - Total Available Power

The system produces up to 1.4 A of combined power at 12.0 VDC Nominal for all powered devices. The outputs listed below share the available power. These outputs are shown as red circles on the faceplate.

– **Terminal 3 - Auxiliary Power.** Use this terminal to power devices requiring continuous power.
– **Terminal 6 (Output A) - Alarm Power Output.** Programmable relay normally open, power on alarm.
– **Terminal 7 (Output B) - Alternate Alarm Power Output**. Programmable relay normally open, power on alarm.
– **Terminal 8 (Output C) - Switched Auxiliary Power.** Programmable relay normally closed, switches power off when the Sensor Reset command is executed.
– **Terminal 24 - Zonex Power.** Use this terminal to power Zonex modules such as the D8125, D8128D, and D8129 Modules.
– **Terminal 32 - SDI Power +.** Use this terminal to power serial device interface (SDI) devices such as keypads, the D9210C Wiegand Control Interface Module, the ICP-SDI-9114 module, and other compatible SDI devices.
– **Terminal 36 - SDI2 Power +.** Use this terminal to power serial device interface 2 (SDI2) devices such as B208, B308, B426, B810, B920, B930, and other compatible SDI2 devices.

4.5 Power Outputs - Continuous Power Output Terminals 3, 8, 24, 32, and 36

The continuous current draw for powered devices connected to Terminals 3, 8, 24, 32, and 36, and the accessory connector must not exceed 1.4 A. Devices powered from these outputs must operate at 12.0 VDC Nominal.

Power Restricted for Fire and Combined Fire and Burglary Systems

Use the Fire System Power Formula to calculate the current available for fire and combined fire and burglary systems (refer to *Power Outputs - Programmable Power Output Terminals 6, 7, and 8, page 26*).

4.6 Power Outputs - Programmable Power Output Terminals 6, 7, and 8

4.6.1 Programming

The power outputs at Terminals 6, 7, and 8 are programmed as Outputs A, B, and C. All outputs are programmed in the Outputs section. Outputs are assigned a output type, (Fire Bell, for example) when they are assigned to an area. Outputs can be assigned to one or more areas. The Bosch defaults set Output A (Terminal 6) as a Steady Alarm Bell output, Output B (Terminal 7) as a Pulsed Fire Bell output, and Output C (Terminal 8) as a Verification or Reset output for smoke detectors. The *D9412GV4/D7412GV4 v2.02 Program Entry Guide* (P/N:

F01U265459) contains complete instructions for programming outputs. Refer to *Terminals 6 and 7, page 27*, *Fire System Power Formula, page 27*, and *Terminal 8, page 28* for descriptions of the functions of each terminal. Refer to the Bell Parameters section of the program to set the Fire Bell, Alarm Bell, and Gas Bell output responses for outputs. Four annunciation patterns are available: Steady, Pulsed, California Standard, Temporal Code 3, and Temporal Code 4.

Voltage Output at Terminals 6, 7, and 8

If Terminals 6, 7, and 8 do not provide the expected output, check:

- Programming for Outputs A, B, and C in the outputs section of the program. For proper operation, do not program a Panel Wide Output the same as an Area Wide Output.
- Bell Parameters section of the program to confirm that the Alarm, Fire, and Gas Bell responses are programmed for the expected duration and pattern.
- Point Assignments section to confirm that each point is programmed for the expected local response.

4.6.2 Terminals 6 and 7

When activated, Terminals 6 (Output A) and 7 (Output B), provide positive (+) 12.0 VDC Nominal power output. Use the power at Terminals 6 and 7 to power bells, siren drivers, piezoelectric fire sounders, electronic horns, or other devices.

Programming determines the format of the output and the conditions that activate it. One self-resetting circuit breaker protects Terminals 6, 7, and 8 against shorts. When using Output A or Output B to activate notification appliance circuits in UL Listed fire alarm applications, install a D192G Indicating Circuit Module.

Available Power

The system combines the 1.4 A of primary power produced by the power supply with the secondary power source (the battery) to produce a total of 2.0 A of alarm power at 12.0 VDC Nominal. Terminals 6 and 7 share the available alarm power.

Power Restricted for Fire and Combined Fire and Burglary Systems

Fire systems are prohibited from using the battery for determining alarm power. Use the fire system power formula described in *Fire System Power Formula, page 27* to calculate the current available for fire and combined fire and burglary systems.

4.6.3 Fire System Power Formula

To calculate the current available at Terminals 6 and 7 for fire and combined fire and burglary systems:

1. Add together the current draws for all devices connected to Terminals 3, 8, 24, and 32, and the accessory connector. This is the total current required for the normal standby condition (NSC).
2. The current available for NSC is 1.4 A. Subtract the NSC current required calculated in Step 1 from the NSC current available, 1.4 A. The difference is the alarm current available for Terminals 6 and 7.

In formula format:

1.4 A - NSC current required (Step 1) = Alarm current available

Refer to the *Approved Applications* chapter inside the *D9412GV4/D7412GV4 v2.02 Installation and System Reference Guide* (P/N: F01U265457) for module or accessory current requirements.

4.6.4 Terminal 8

Terminal 8 provides continuous positive (+) 12.0 VDC Nominal power. Output C interrupts the power at Terminal 8 when activated. Use Terminal 8 to power smoke detectors or other devices that are reset by interrupting power. One self-resetting circuit breaker protects Terminals 6, 7, and 8 against shorts.

Verification/Reset Output

The default program sets Output C (Terminal 8) as a verification and reset output. Refer to *Output Parameters and Point Assignments* in the *D9412GV4/D7412GV4 v2.02 Program Entry Guide* (P/N: F01U265459) for instructions on programming verification/reset outputs and points.

Performing a sensor reset at a keypad produces a five-sec activation of reset outputs. The control panel ignores verification and reset points during the five-sec activation.

5 Specifications

Voltage Input (Power Supply)[1]	Primary:	Terminals 1 and 2	16.5 VAC 40 VA class 2 plug-in transformer (D1640)
	Secondary:	Terminals 4 and 5	Sealed lead-acid rechargeable battery (12.0 VDC, 7 Ah or 12.0 VDC, 17.2 or 18 Ah). The control panel supports up to two 12.0 VDC, 7 Ah batteries using the D122/D122L Dual Battery Harness or two D1218 (12.0 VDC, 17.2 or 18 Ah) batteries using a D122/D122L.
Current Requirement	Control Panel: Idle 225 mA; Alarm 300 mA. Refer to the *Current Rating Chart for Standby Battery Calculations* section in the *D9412GV4/D7412GV4* v2.03 *Installation and System Reference Guide* (P/N: F01U265457) for the current draw requirements of other system components.		
Power Outputs[2]	All external connections are power-limited except battery terminals		
	Continuous Power Outputs	Terminals 3, 24, 32, 36	1.4 A maximum at 12.0 VDC Nominal (continuous supply) total for all devices and outputs supplied at Terminals 3, 24, 32, and 36.
	Alarm Power Output	Terminals 6 and 7	2.0 A maximum at 12.0 VDC Nominal output. Output can be steady or one of four pulsed patterns depending on programming. Refer to *Outputs* in RPS Help.
	Switched Aux Power	Terminal 8	1.4 A maximum at 12.0 VDC Nominal output. Continuous output is interrupted by Sensor Reset, or alarm verification depending on programming. Refer to *Outputs* in RPS Help.
	Fire and Fire/Burglary Systems	To comply with UL 985 and 864 listing standards for fire alarm systems, the total combined continuous and alarm current draw for the system during alarm conditions must be limited to 1.4 A provided by the primary power supply (rectified AC). If current draw for the system exceeds 1.4 A, use a UL Listed 12 VDC regulated, power limited auxiliary power supply module such as the B520 (refer to the *Keyswitch Wiring* section).	
[1]Requires a UL Listed power supply. [2]For UL 864 applications, refer to *6.0 Compatibilities* for compatible devices.			
Minimum Operating Voltage	10.2 VDC		
SDI Bus	SDI Bus A+:	9 VDC 15000 ft (4572 m) maximum	

	SDI Bus B-:	9 VDC 15000 ft (4572 m) maximum	
SDI2 Bus	SDI2 Bus A+;	12 VDC nominal 7500 ft (2286 m) maximum[3]	
	SDI2 Bus B-:	12 VDC nominal 7500 ft (2286 m) maximum[3]	
Telephone Connections	Connection:	RJ31X or RJ38X jack can connect the control panels.	
	Two telco lines:	Bosch Security Systems, Inc. D928 Dual Phone Line Module required for two phone line service. Supervision supplied by the control panel.	
[3]See *SDI2 Bus Wiring Recommendations* for more details			
Battery Discharge/ Recharge Schedule	Discharge Cycle:	13.9 VDC	Charging float level.
		13.8 VDC	Charging status LED on.
		12.1 VDC	Low Battery Reports if programmed. Low Battery LED on.
		10.2 VDC	Minimum operational voltage.
		10.0 VDC	Battery load shed.
	Recharge Cycle:	AC ON	Load shed relay resets, battery charging begins, Battery Trouble and AC Restoral Reports sent.
		13.7 VDC	Battery Restoral Report sent, Low Battery LED off.
		13.9 VDC	Charging status LED off, battery float charged.
Environmental	Temperature:	+32˚ F to +120˚ F (0˚ C to +49˚ C)	
	Relative Humidity:	Maximum 93% non-condensing	
Arming Stations	B915/B920/B930/B921C/B942 Keypads, D1255/D1255B/D1255RB Keypads, D1256RB Fire Command Centers; D1257RB Fire Alarm Annunciators; D1260/D1260B Keypads; D1265 Keypads; Keyswitch; Keyfobs		
Point Thresholds	On-board Points 1 to 8	Open	Greater than 3.7 VDC, but less than 5.0 VDC.
		Normal	Greater than 2.0 VDC, but less than 3.0 VDC
		Short	Greater than 0.0 VDC, but less than 1.3 VDC.
Compatible Enclosures	D8103 Universal Enclosure, D8109 Fire Enclosure, D8108A Attack Resistant Enclosure, BATB-40/BATB-80 Battery Box		
[2]See *SDI2 Bus Wiring Recommendations* for more details			

5.1 B520 Specifications

Voltage Input (Power Supply)	Primary:	18 VAC terminal	18.0 VAC, 50 VA class 2 plug-in transformer -TR1850 (18.0 VAC, 50 VA class 2 plug-in transformer – TR1850-CA for Canada)
	Secondary:	Batt 1, Batt 2 terminals	The B520 Auxiliary Power Supply Module supports the connection of two independantly monitored sealed lead-acid rechargeable batteries (12.0 VDC, 7 Ah through 12.0 VDC, 36 Ah).
Current Requirements	Refer to the *B520 Auxiliary Power Supply Module Battery Standby Chart* section in the *B520 Auxiliary Power Supply Module Installation and Operation Guide* (P/B: F01U265445) for the current draw requirements of other system components.		
Power Outputs*	All external connections are power-limited except battery terminals		
	Continuous Power Outputs	SDI2 Out, AUX PWR terminals (rated range)	2.0 A maximum at 11.5 to 12.2 VDC (special application) (continuous supply) total for all devices and outputs supplied at Terminals 1-4, 6-36.
	Fire and Fire/ Burglary Systems	To comply with UL 985 and 864 listing standards for fire alarm systems, the total combined continuous and alarm current draw for the system during alarm conditions must be limited to 2.0 A provided by the primary power supply (rectified AC). If current draw for the system exceeds 2.0 A, remove connected devices until the current draw falls below 2.0 A. Then connect the removed devices to an additional B520 Auxiliary Power Supply Module or to an external power supply	
*For UL 864 applications, refer to the *Compatible Accessories* section.			
Minimum Operating Voltage	10.2 VDC		
SDI2 Bus	SDI2 Bus A: SDI2 Bus B:	8 VDC-2000 ft (610 m) maximum 8 VDC-2000 ft (610 m) maximum	
Battery Discharge/ Recharge Schedule	Discharge Cycle	13.2 VDC – Charging float level.	
		12.0 VDC – Low Battery and AC Fail Reports if programmed. Low Battery LED on.	
		10.2 VDC – Minimum operational voltage.	
		9.8 VDC – Battery load (operation continue if AC is present).	

	Recharge Cycle	AC ON – Load shed relay resets, battery charging begins, Battery Trouble and AC Restoral Reports sent.
		12.6 VDC – Battery Restoral Report sent, Low Battery LED off.
Environmental	Temperature:	+32˚ F to +120˚ F (0˚ C to +49˚ C)
	Relative Humidity:	Maximum 93% non-condensing
Compatible Enclosures	D8103 Universal Enclosure (requires B12 mounting plate), D8108A Attack Enclosure (requires B12 mounting plate), B10 Enclosure, D8004 Transformer Enclosure, D2203 Enclosure, BATB-80 Enclosure, BATB-40 Enclosure (requires B12 mounting plate), AE1, AE2 Enclosures	

Table 5.1: B520 Specifications

5.2 Terminal Wiring Requirements

Terminal No	Terminal Description	Requirements
1	AC	18 AWG min (up to 14 AWG max)
2	AC	18 AWG min (up to 14 AWG max)
3	+ AUX POWER	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on current.
4	BATTERY -	Bosch supplied wire lead, included with panel.
5	BATTERY +	Bosch supplied wire lead, included with panel.
6	OUTPUT A	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on current.
7	OUTPUT B	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on current.
8	OUTPUT C	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on current.
9	COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on current.
10	EARTH GROUND	14 to 16 AWG
11	POINT 1	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
12	POINT 1/2 COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
13	POINT 2	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
14	POINT 3	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
15	POINT 3/4 COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.

Terminal No	Terminal Description	Requirements
16	POINT 4	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
17	POINT 5	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
18	POINT 5/6 COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
19	POINT 6	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
20	POINT 7	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
21	POINT 7/8 COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
22	POINT 8	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on loop resistance less than 100 Ω.
23	ZONEX COMMON	22 AWG min (up to 14 AWG max)
24	ZONEX POWER	22 AWG min (up to 14 AWG max)
25	ZONEX IN 2*	22 AWG min (up to 14 AWG max)
26	ZONEX OUT 2*	22 AWG min (up to 14 AWG max)
27	ZONEX IN 1	22 AWG min (up to 14 AWG max)
28	ZONEX OUT 1	22 AWG min (up to 14 AWG max)
29	SDI COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on peripheral device current.
30	SDI DATA BUS B	22 AWG min (up to 14 AWG max)
31	SDI DATA BUS A	22 AWG min (up to 14 AWG max)
32	SDI POWER	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on peripheral device current.
33	SDI2 COMMON	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on peripheral device current.
34	SDI2 DATA BUS B	22 AWG min (up to 14 AWG max)
35	SDI2 DATA BUS A	22 AWG min (up to 14 AWG max)

Terminal No	Terminal Description	Requirements
36	SDI2 POWER	Terminal accommodates 14 to 22 AWG, use appropriate wire size based on peripheral device current.
*D9412GV4 only. Terminals 25 and 26 are NOT USED on the D7412GV4 Control Panel.		

5.3 Compatibilities

Notice!
Where the fire alarm transmitter is sharing on-premise communications equipment, the shared equipment must be UL Listed (ITE or fire protective signaling).

Compatible Accessories[1]					
Model	**Title**	**UL 864**	**UL 985**	**Intrusion**	**cUL Intrusion**
B208	Octo-input Module	X	X	X	X
B308	Octo-output Module	X	X	X	X
B426/B420	Conettix Ethernet Communication Module	X	X	X	X
B440[5]	Plug-in Cellular Communicator	X	X	X	
B441[5]	Plug-in CDMA Cellular Communicator	X	X	X	
B450	Plug-in Communicator Interface	X	X	X	X
B520	Auxiliary Power Supply Module	X	X	X	X
B810[3]	RADION receiver SD		X	X	
B820[2]	Inovonics Interface Module		X	X	
B915	Basic Keypad		X	X	X
B920	Two-line Alphanumeric Keypad		X	X	X
B921C	Two-line Capacitive Keypad		X	X	X
B930	ATM Style Alphanumeric Keypad		X	X	X
B942/B942W	Touch Screen Keypad		X	X	X
D113	Battery Lead Supervision Module	X	X	X	X
D122/D122L	Dual Battery Harness	X	X	X	
D125B	Powered Loop Interface Module	X	X	X	X
D126	Standby Battery (12V, 7Ah)				
D129	Dual Class A Initiation Circuit Module	X	X	X	
D130	Relay Module	X	X	X	
D132A[4]	Smoke Detector Reversing Relay Module		X	X	X
D161	Phone card				

Compatible Accessories[1]					
Model	**Title**	**UL 864**	**UL 985**	**Intrusion**	**cUL Intrusion**
D162	Phone cord				
D185	Reverse Polarity Module	X	X	X	
D192G	Bell Circuit Supervision Module	X	X	X	
D928	Dual Phone Line Switcher	X	X	X	X
D1255RB	Fire Keypad	X	X	X	X
D1256RB	Fire Keypad	X	X	X	
D1257RB	Fire Alarm Annunciator	X	X	X	X
D1218	12 V, 17.2 Ah Rechargeable Battery				
D1255/D1255B	Keypads (General Purpose)		X	X	X
D1255W	Text Keypad (white)		X	X	X
D1260/ D1260B[2]	Keypads		X	X	X
D1640	16.5 VAC 40 VA Transformer	X	X	X	
D1640-CA	16.4 VAC 40 VA Transformer for Canada				X
D8004	Transformer Enclosure	X	X	X	
D8125	POPEX Module	X	X	X	X
D8125MUX	Multiplex Bus Interface	X	X	X	
D8128D	OctoPOPIT Module	X	X	X	X
D8129	OctoRelay Module	X	X	X	X
D8130	Release Module	X	X	X	
D8132	Battery Charger Module		X	X	X
D9127U/T	POPIT Module	X	X	X	X
D9210C	Access Control Interface Module	X	X	X	X
DX4010V2	USB/Serial Interface Module				
DX4020	Network Interface Module	X	X	X	X
ITS-DX4020-G	GPRS/GSM Communicator	X	X	X	
ICP-SDI-9114	SDI Splitter	X	X	X	
ICP-EZTS	Tamper Switch		X	X	X
ZX776Z	PIR Motion Sensor [15 m (50 ft)] with POPIT			X	
ZX794Z	PIR Motion Sensor [24 m (80 ft)] with POPIT			X	
ZX865	PIR/Microwave Motion Sensor with POPIT			X	
ZX938Z	PIR Motion Sensor with POPIT			X	

Compatible Accessories[1]					
Model	**Title**	**UL 864**	**UL 985**	**Intrusion**	**cUL Intrusion**
ZX970	PIR/Microwave Motion Sensor with POPIT			X	
RFBT-A[3]	RADION speciality			X	
RFDL-11-A[3]	RADION TriTech			X	
RFDW-RM-A[3]	RADION contact RM			X	
RFDW-SM-A[3]	RADION contact SM			X	
RFSM-A[3]	RADION smoke		X	X	
RFRP-A[3]	RADION repeater		X	X	
RFPR-12-A[3]	RADION PIR			X	
RFPR-C12-A[3]	RADION PIR C			X	
RFUN[3]	RADION universal transmitter			X	
RFPB-TB-A[3]	RADION panic			X	
RFPB-SB-A[3]	RADION panic			X	
RFKF-TB-A[3]	RADION keyfob			X	
RFKF-FB-A[3]	RADION keyfob			X	
[1]Where the fire alarm transmitter is sharing on-premise communications equipment, the shared equipment must be UL Listed (ITE or fire protective signaling). [2]Version 1.04 or above. [3]Compatible with version 2.xx or higher [4]Refer to Two-*Wire Smoke Detectors* section in the *Approved Applications* chapter in the D9412GV4/*D7412GV4 v2.02 Installation and System Reference Guide* (P/N: F01U265457) for a listing of compatible two-wire smoke detectors (Household Fire Alarm Applications only). [5]A B450 plug-in communicator interface module is required in order to use the B44x cellular communicator.					

Table 5.2: Compatible Accessories[1]

Compatible Accessories[1]					
Model	**Title**	**UL 864**	**UL 985**	**Intrusion**	**cUL Intrusion**
Latin America, Europe, Middle East, Australia, China					
B442	Plug-in GPRS Cellular Communicator[1]	X	X	X	X
Canada, Europe, Latin America, Middle East					
B443	Plug-in HSPA+ Cellular Communicator[1]	X	X	X	X
[1]A B450 plug-in communicator interface module is required in order to use the B44x cellular communicator.					

Table 5.3: Regional compatible Accessories[1]

5.4 Circuit Classes

Onboard Points

Onboard points, points 1 to 8, are Class B, Style B Initiating-Device Circuits.

Zonex Bus or Buses

Zonex buses are Class B, Style 4 Signaling Line Circuits.

Notification Appliance Circuit (NAC)

The control panels do not have an onboard NAC.

A D192G can be added to the control panel (or D8129/B308) and is Class B, Style W.

Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, NY 14450
USA
www.boschsecurity.com
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